8. Development of Multilevel Models to Ascertain Characteristics of School Children in Relation to School Education Environment

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1. Background at the time of commencing the study

Most of the survey data on education are hierarchically-structured, in such a manner as data on schools – data on classes in school – data on children in class in school. It is pointed out that if we analyze such a set of data by using an ordinary analysis method based on a random sampling, we may reach a wrong conclusion. In such cases, analysis using multilevel models, in which the hierarchy is taken into consideration, is said to be effective. Empirical research using this method has been conducted in pedagogy-related fields in foreign countries. In Japan, there have been some cases of research in which hierarchical linear models, which are basic multilevel models, were applied in the field of educational psychology.

2. Purpose of the study

This study mainly aims to create multilevel models, based on hypotheses, for a hierarchically-structured set of data on education research and reanalyze such data for the purpose of grasping the relationship between characteristics of school children and variables of the education environment in a broad sense.

3. Outline of the study results

Firstly, regarding a set of data on tests for which students' choice of courses are ascertained for each test item, we created models, also taking the hierarchy into account, and made an analysis. The analysis results suggested that how difficult students feel each test item to be differs, in many cases, depending on their choice of courses, even if their characteristics are the same.

Secondly, we analyzed a set of data on tests concerning English lessons at elementary schools. Considering the fact that English lessons are conducted in ways that vary from school to school, and supposing that parameters concerning difficulties of each item are different among schools, we used models adding predictor variables for the analysis. As a result, it was found that these models are relatively more compatible than other models, and are able to presume disparities in the parameters among schools for many of the items.

(1) Keywords

(i) Multilevel models, (ii) Analysis of hierarchical data

(2) Category of the study

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(3) Study period

2008-2009

(4) Reports on this study

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